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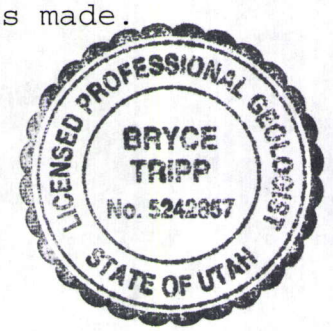
Utah Geological Survey

Project: The geologic setting of pits on the northwest side of Stansbury Island			Requesting Agency: DOGM, Minerals Regulatory Program
By: Bryce T. Tripp	Date: 12/30/05	County: Tooele	Job No: 05-01
USGS Quadrangle: Badger Island (1:24,000)			

BACKGROUND

I prepared this report at the request of the Utah Division of Oil, Gas and Mining (DOGM). The report is intended to provide geologic data to aid in DOGM's decision concerning the regulatory status of a mineral extraction operation represented by John Bleazard. The operation consists of four pits (from which landscape boulders have been removed)on the northwest side of Stansbury Island, Tooele County, Utah. The question is whether these pits require DOGM mining permits or whether they are exempt because they are "rock aggregate" under the State's sand and gravel rules.

I examined pit location sketch maps from DOGM and available geologic maps and data to assess the geologic nature of the material that has been mined. No field examination was made.



GRAVEL RESOURCES OF STANSBURY ISLAND

Geologic Setting

Stansbury Island is a rugged Basin and Range mountain with bedrock composed mostly of Proterozoic and Paleozoic quartzites, limestone, and dolomite. The range is thinly covered by unconsolidated sediments which were predominantly deposited by Lake Bonneville. Lake Bonneville eroded bedrock from the island as the depth of the lake increased and then decreased in a cycle that lasted from about 30,000 to 10,000 yearS ago. At its

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highest point the lake covered about 60% of the area of Stansbury Island. During long periods of time when the lake level did not fluctuate much, lake wave action deposited rock fragments eroded from the bedrock into three shoreline terraces (figure 1). From highest to lowest they are the Bonneville, Provo, and Gilbert terraces (Currey, 1982). Sand and gravel deposits are usually associated with these terraces.

Quaternary Sedimentary Units

Unconsolidated sediments on the island range from clay to boulders, but some areas of the island have deposits that are predominantly sand and gravel. Palmer(1970) produced the most recent, detailed geologic map of Stansbury Island, but he "lumped" all the unconsolidated sediments under the heading of Quaternary "undifferentiated alluvium." He did summarize the sand and gravel resource of the island as "neither extensive nor of high quality." Chapusa's 1969 map (figure 2)is more useful for this review because it separates out three Quaternary units: 1) Qlts - lake shore sand, 2) Qag - alluvium and colluvium, and 3) Qltg - gravel deposits. Most of the Qlts in the area is probably medium-grained, oolitic, carbonate sand deposited by Great Salt Lake currents and by the wind. The Qag is probably a poorly sorted mix of silt-sized to boulder-sized quartzite, limestone, and dolomite rock fragments that were partly emplaced by alluvial processes and partly by slope wash. The Qltg is predominantly moderately sorted, sand to cobble-sized quartzite, limestone, and dolomite largely deposited by lacustrine wave action.

Previous Mining

Small amounts of unconsolidated material have been previously mined from the Qltg unit on Stansbury Island. The Utah Geological Survey (UGS) recorded information for three pits (figure 2)in the study area during compilation of its Utah Mineral Occurrence System database (Utah Geological Survey, 1979). Mr. Bleazard's site 3 may be an extension of UGS pit A. A brief summary of the pertinent data collected by the UGS for these pits follows:

Pit A - Badger Island Pit #1 - The pit measured 125 by 100 yds and had an average depth of 4 yds. The pit contained quartzite and carbonate sand, pebbles, cobbles, and boulders interbedded with sand and silt. The rock fragments are

subrounded to rounded. The material was deposited by wave action of Lake Bonneville.

Pit B - Utah Department of Highways Pit No. 23056 - The pit measured 330 by 67 yds and had an average depth of 1.3 yds. It consisted predominantly of wind-blown silica dune sand with no gravel [100% of the material passed through a #8 screen (less than 2.36 mm)].

Pit C - Badger Island Pit #3 - The pit measured 65 by 50 yds with an average depth of 2 yds. The material at this pit consisted of quartzite and carbonate sand, pebbles, and cobbles which were rounded to well rounded. The material was deposited by Lake Bonneville wave action.

CHARACTER OF GEOLOGIC MATERIAL IN BLEAZARD PITS

The extent of Mr. Bleazard's pits is shown on figure 2, plotted on top of the geologic outcrop pattern from Chapusa (1969). If the pit outlines are accurate, then pits 1, 2, and 4 are entirely located on quartzite bedrock (possibly with a thin veneer of colluvium) as mapped by Chapusa. The northern half of pit 3 is also on quartzite bedrock but the southern half is in Chapusa's Qltg unit.

FUTURE ADDITIONAL WORK

The geological interpretation in this report is based on data thought to be reliable but if increased certainty is required, a GPS survey of Mr. Bleazard's pits and a geological examination of the material being removed could be done to verify the findings.

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REFERENCES

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Currey, D.R., 1982, Lake Bonneville: selected features of relevance to neotectonic analysis: U.S. Geological Survey Open-File Report 82-1070, scale 1:500,000, 30 p.

Palmer, D.E., 1970, Geology of Stansbury Island, Tooele County, Utah: Provo, Brigham Young University Geology Studies, vol. 17, pt. 2, p. 3-30.

Utah Geological Survey, 1979, Badger Island 7.5' quadrangle file: Unpublished Utah Mineral Occurrence System database files.

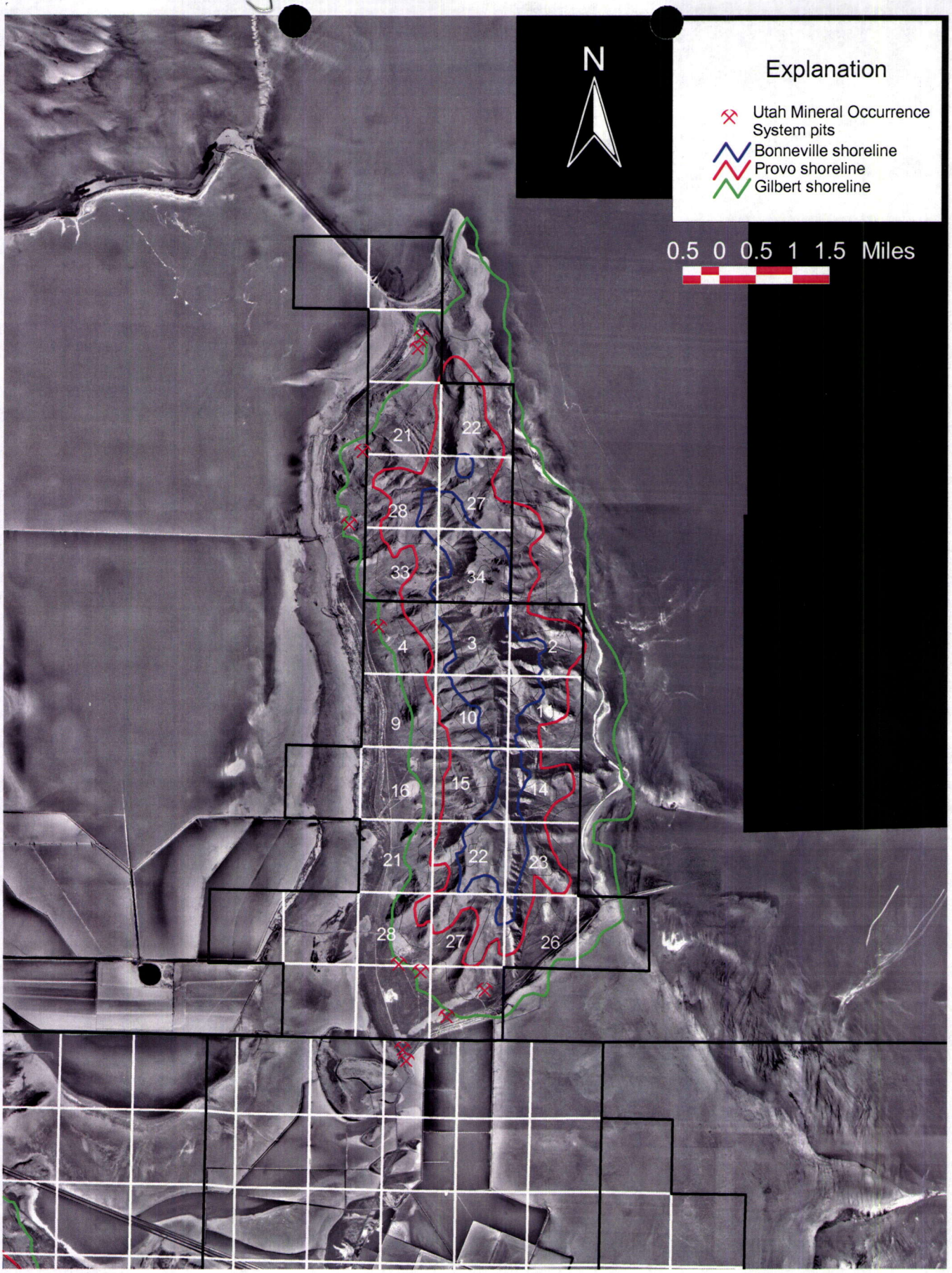

Figure 1. Location of Utah Mineral Occurrence System pits (Utah Geological Survey, 1979) and Lake Bonneville shorelines on Stansbury Island, Tooele County, Utah. Shoreline data from Currey (1982). U.S. Geological Survey orthophoto base and other data downloaded from the Utah Automated Geographical Reference Center.

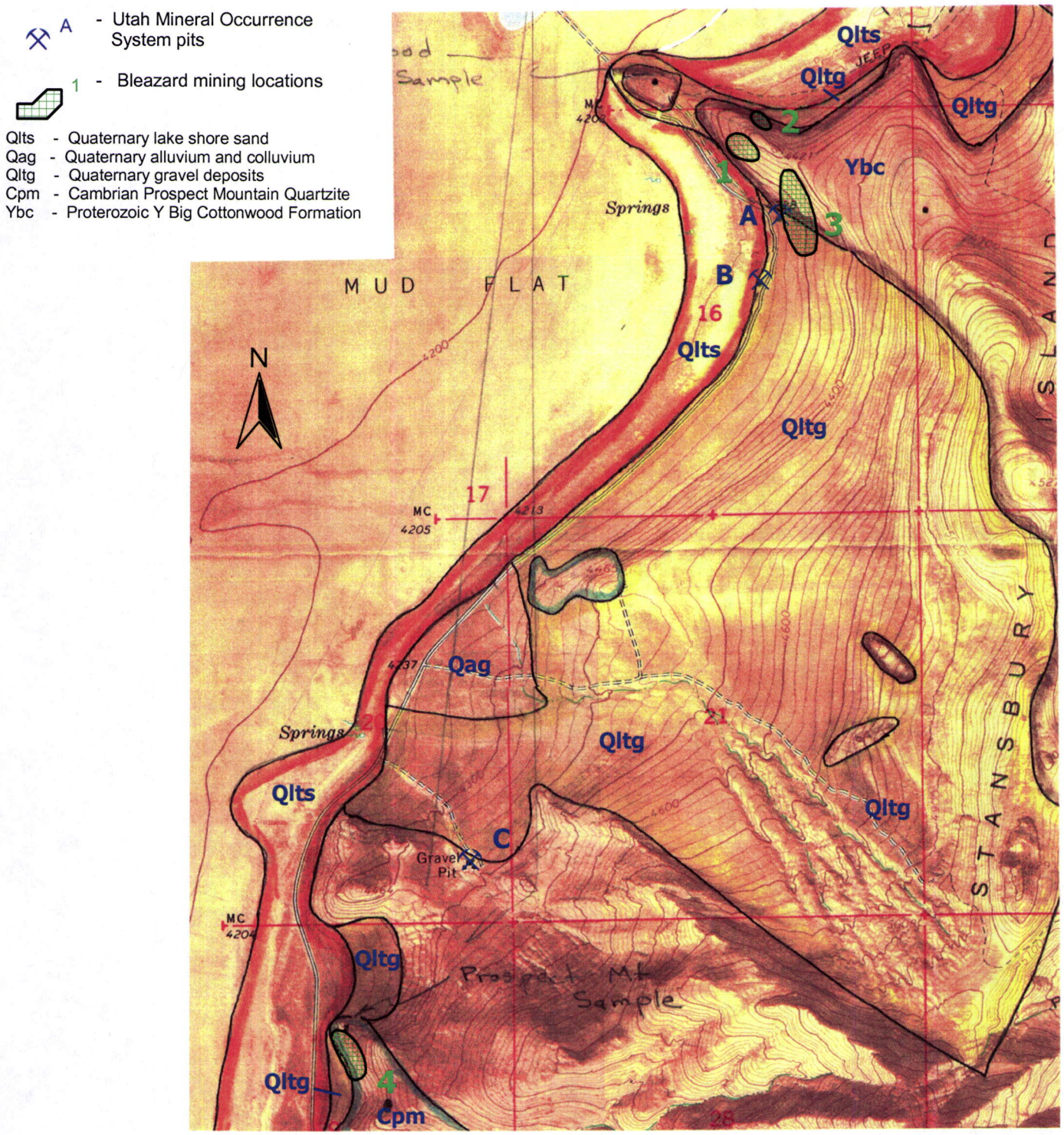

Figure 2. Geology and pit locations on the northwest end of Stansbury Island, Tooele County, Utah. Base map is the USGS Badger Island 7.5', color, orthophoto quadrangle. Red lines are one-square-mile section grid. Geologic formation outcrops were taken from Chapusa (1969). Blue pit locations are from Utah Geological Survey (1979). Green pit areas were taken from DOGM unpublished maps.